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Gwyn M. Jarrett, Project Manager
Department of the Army
Corps of Engineers, Omaha District
CENWO-PM-AA
Attn: Chatfield Reservoir Storage Reallocation FR/EIS
1616 Capital Avenue
Omaha, Nebraska 68102-4901

RE: EPA Comments on the Final Integrated Feasibility Report and Environmental Impact Statement for the Chatfield Reservoir Storage Reallocation Project, CEQ # 20130228

Dear Ms. Jarrett:

The U.S. Environmental Protection Agency Region 8 (EPA) has reviewed the U.S. Corps of Engineers' (Corps') Final Integrated Feasibility Report and Environmental Impact Statement (Final FR/EIS) for the Chatfield Reservoir Storage Reallocation Project (Project). Our review was conducted in accordance with EPA's responsibilities under Section 102 of the National Environmental Policy Act (NEPA), 42 U.S.C. § 4332(2)(c), and Section 309 of the Clean Air Act, 42 U.S.C. § 7609. Section 309 of the Clean Air Act directs EPA to review and comment in writing on the environmental impacts of any major federal agency action.

The EPA appreciates the Corps' willingness to engage with us throughout development of the Draft and Final EISs in response to our comments and concerns. The Final FR/EIS is an improvement over the Draft FR/EIS. The Final FR/EIS itself, Appendix J, and the Adaptive Management Plan (AMP) include expanded consideration of water quality effects, potential effects of climate change, more detail regarding future monitoring, and identification of management options to reduce effects to water quality. We are providing recommendations and considerations before the project becomes operational on the following topics: water quality impacts to the South Platte River and Chatfield Reservoir, the spatial extent of the effects in the South Platte, and detail regarding adaptive management. The Final FR/EIS defers mitigation for, and prevention of, the potential effects to water quality and aquatic resources to a future adaptive management scenario that is not described in detail.

I. Assessment of Effects to Chatfield Reservoir

A. Potential Nutrient Effects

The EPA remains concerned with nutrient effects in, and downstream of, Chatfield Reservoir due to the uncertainty associated with the model, its assumptions, and the predicted increases in internal loading (Table 2-6). We appreciate that the Corps reevaluated the data considered in the Draft FR/EIS to characterize Chatfield Reservoir and reassessed its conclusion regarding whether the reservoir goes hypoxic. As the Final FR/EIS acknowledges, this reevaluation concluded that available data were extremely limited. Given this nutrient model's inherent predictive limits and the predicted increases in internal nutrient loading (Table 2-6), we support the Corps' incorporation of future monitoring into the AMP. Monitoring will enable better reservoir characterization, project effect evaluation, support for dynamic model development, and potential mitigation measure identification. Because monitoring, future modeling, and adaptation are key to assuring there will be no unforeseen nutrient impacts, we recommend the Record of Decision (ROD) identify the AMP as a requirement of the Water Supply Agreement and subagreements among the Corps, the Colorado Department of Natural Resources, and the Chatfield Water Providers.

B. Current Local Model Limitations

The local model assumes that stratification remains strong throughout the reservoir through the summer, but the EPA questions whether this is the case every year throughout the reservoir, and whether similar stratification will occur under the reallocation. Our questions arise because the modeling assumption is based on only two years of data at one monitoring point and only one of these datasets was used for modeling.

1. Temporal Variability

It is difficult to know what condition the modeled year, 2012, represents given natural variability. The 2012 condition may be worst, average, or minimal. Additionally, the Project has the potential to change summer stratification dynamics and the associated range of variability by increasing mixing throughout the water column associated with the increased water level fluctuations of 5 to 17 feet. Pre-project monitoring would help characterize temporal variability across and within years. The AMP indicates that monitoring will be conducted, but it does not specify how many years of monitoring will be conducted. We provide a suggestion below in the AMP section of this letter.

2. Characterizing Spatial Variability

A potential weakness in the modeling analysis is the use of only one modeled point to represent reservoir conditions. It is unlikely that the modeled point, the Near Dam location, is representative of the entire reservoir. The Near Dam site is one of the deepest parts of the reservoir and conditions (stratified vs. mixed, hypoxic vs. oxic) outside of the Near Dam location are likely to differ. Shallower areas are more susceptible to water column mixing due to wind and more frequent nutrient export from the bottom of the reservoir to the epilimnion where nutrients are monitored for compliance with the water quality standard and their effect is greatest. We recommend the dynamic model be designed to describe and consider the potential extent and influence of summertime mixing

throughout the reservoir. The AMP describes three locations within the reservoir where monitoring will be conducted. We recommend the Technical Advisory Council (TAC) develop a modeling plan prior to, or near the beginning of monitoring, in order to determine if these three locations will provide sufficient spatial resolution to characterize the spatial variability of the Reservoir.

II. Assessment of Effects to the South Platte River

A. Spatial Extent and Magnitude of Effects

The South Platte currently experiences water quality problems that could be exacerbated by a decrease in dilution flow from Chatfield Reservoir. The Final FR/EIS acknowledges that the Project will have an effect on South Platte River flow below the Reservoir, but does not assess the spatial extent and magnitude of change in water quality as it pertains to existing water quality impairments and TMDLs. Appendix J does not provide rationale for the statement that only one mile of the South Platte below Chatfield would be affected (p. 60). The one-mile extent appears inconsistent with the information presented in the Final FR/EIS, specifically that average annual flows decrease at the 15th Street gage by 7% and the information in Table 3-7 which indicates that the "Below Chatfield" critical low flow ranges from 2.2% to 37.5% of the monthly critical low flow at the "Above Centennial" location. Both of these locations are more than one mile downstream of the Dam. The rationale provided in Appendix J is that flows increase in a downstream direction. While the flows do dramatically increase between these two locations, the Final FR/EIS does not present information to show that the effect of the project is minimal.

In order to understand the extent of the effect of the Project's reduction in flows, a comparison of the pre- and post-Project flows at locations progressively downstream of the reservoir is necessary. The EPA is interested in, and previously recommended consideration of, the relative change in critical low flow at the locations identified by TMDLs and at the locations of permitted dischargers. The critical low flow is associated with, and changes at, particular locations, as is presented in the Nitrate TMDL for Segment 14 (Table 3). The Nitrate TMDL for Segment 14 identifies critical low flows at six locations along the South Platte, only one of which has been assessed for effects in Appendix J. In our comments on the AMP below, we provide a recommendation to address this comment.

B. Potential Nutrient Effects

In addition to flow reductions, imports of nutrients into the South Platte may increase due to the predicted increase in internal loading within Chatfield Reservoir. Given the location of the planned bottom release from the reservoir (p. 2-34) and the possible increase in internal loading in the lower depths of the reservoir, it will not only be important to monitor for nutrient effects within the reservoir but also downstream in the South Platte. A potential mitigation measure if nutrient effects in the South Platte are observed would be to release water taken from different depths of the reservoir. We recommend the AMP identify this potential mitigation measure.

C. Colorado Water Quality Standards & Low Flow

The Final FR/EIS seems to deemphasize the importance of protecting water quality in the South Platte River. We would like to clarify two points in order to help clarify the importance of protecting water quality in the South Platte. The intent of including the language describing the low flow exception for Colorado Discharge Permit System (CDPS) permit is unclear and we are not sure if it is necessary as this document is not making CDPS permitting decisions but rather conveying information captured in the permit. An accurate statement is "Colorado's water quality permitting/discharge permitting may make exceptions regarding low flows" not "Colorado's water quality standards make exceptions regarding low flows" (p. 48). Additionally, it is important to note that use-protected waterbodies that have a "minimum level of protection" such as Segment 15 of the South Platte must still meet all water quality standards. Antidegradation review for reviewable waterbodies such as Segment 14 of the South Platte entails protecting quality at a level better than the water quality standards.

III. Adaptive Management Plan

The EPA appreciates the addition of explanation that the AMP, Appendix GG, directly supports the Compensatory Mitigation Plan (CMP) and that Water Storage Agreements and sub-agreements will establish obligations for accomplishing both Plans (p. 3). The AMP does not contain detail regarding potential management actions to mitigate water quality effects based upon specific triggers associated with the future dynamic modeling or monitoring. It seems that the current intent is that the Technical Advisory Committee (TAC) will generate details for potential mitigation commitments. While the TAC can help to inform development of the action thresholds, management scenarios, and mitigation commitments, we recommend the Corps, CWCB, and the Providers develop a strategy relating action thresholds to management actions and incorporate it into the ROD prior to Project commencement.

A. Water Quality Monitoring

1. Chatfield Reservoir

The Corps' expansion of the water quality coverage in the AMP includes more detail on water quality monitoring provisions for the Project and establishes a need for cooperation among stakeholders (including the Chatfield Watershed Authority). The AMP does not specify how long monitoring will be conducted. We suggest that a minimum of three years of pre-Project data are necessary to support Monitoring Objectives 1 and 3 (*Characterize the Spatial and Temporal Occurrence of Water Quality Conditions*, and *Facilitate Application of a Dynamic Water Quality Model to Chatfield Reservoir*) and to support identification/characterization of a baseline condition. We also suggest a minimum of five years of post-Project data are necessary to support Monitoring Objective 2 (*Determine if Reallocation has Impacted Water Quality Conditions in Chatfield Reservoir*).

The AMP also does not identify assessment methods or thresholds associated with eutrophication, including DO, nutrients, and chlorophyll levels that would determine when management actions are necessary to protect water quality standards. We recommend the Corps develop a management strategy based upon action thresholds from observed data or modeling results in coordination with the members of the TAC to prevent decreases in water quality. We recommend these actions include both non-operational opportunities to reduce external and internal nutrient loading through point source, nonpoint source, TMAL controls, and support for on-going (and potentially additional) nutrient reduction projects in the watershed (e.g. through the Chatfield Watershed Authority) and operational measures such as the Collective Operational Scenario. The AMP currently identifies operational controls but not the non-operational ones. Early action measures based upon increasing trends of observed data, use of eutrophication-related parameters other than those already identified (nitrogen, dissolved oxygen, pH) and use of intermediate thresholds lower than exceedances of water quality standards are also an important component to preventing problems before they occur.

2. South Platte River

There are two potential sources of Project impact to the South Platte River. First, the Project will reduce Reservoir outflow, which provides dilution for downstream waste dischargers and other pollutant sources. Second, the Project is likely to increase nutrient concentrations in the outflow due to higher internal nutrient loading and use of a bottom release outfall. The EPA appreciates the AMP's establishment of a commitment that the Providers will either 1) release water from Chatfield Dam into the South Platte to maintain critical low flow during periods of critical low flow or events that would cause low flows based upon measurements at the PLACHACO gage or 2) develop a study and conduct monitoring to determine if effects to water quality are occurring and what alternate means are necessary. Maintenance of critical low flow is an important consideration to offset some impact associated with water quality problems caused by reduced dilution flow associated with the Project. It is also important to consider that the Project is reducing flows higher than critical low flows at which water quality problems are occurring.

In order to ensure that the Project does not contribute to water quality problems, we recommend that further study be undertaken to consider the full range of flow conditions at which water quality problems are occurring and identify if the project is reducing those flows. The critical low flows are utilized to capture a "worst case scenario" in TMDL and permitting decisions when assimilative capacity is minimal because flow is at its lowest and pollutant loading is at its highest. The Final FR/EIS did not conduct a complete analysis of when water quality problems are occurring. It conducted a TMDL-focused analysis that examined whether the low flows, which are the basis for the TMDLs, would be affected by the Project.

The EPA also notes that, because of the predicted increases in nutrient concentrations in deep Reservoir water, the Project could result in increased nutrient concentrations in the outflow. For that reason, we recommend that the TAC conduct monitoring of nutrients and nutrient effects (total phosphorus, total nitrogen, chlorophyll, algae, dissolved oxygen) in the South Platte at key locations along the reach from the dam to the extent that flow reductions between the pre- and post-project condition are predicted. An appropriate downstream location may be the 15th Street gage as flow

reductions are identified at this point. If increasing trends in nutrients or nutrient-related parameters (chlorophyll, pH, dissolved oxygen), exceedances of standards/assessment criteria, or nutrient-related effects are observed or the model results indicate water quality problems, the Corps and the TAC may need to reconsider mitigation for the Project's effects.

B. Future Dynamic Water Quality Model

The Final FR/EIS and the AMP include a commitment to develop and implement a dynamic water quality model to better manage and mitigate potential water quality impacts of the reallocation Project. We support the Corps' decision that the Providers continue to collaborate with the Chatfield Watershed Authority in development of a dynamic model and that the TAC oversee its development.

The AMP does not provide detail about how the modeling results will be used to manage the system to prevent water quality impacts, nor does it make the intent of the model entirely clear. It is not clear if the model will be used proactively to predict impacts before storage under the reallocation occurs. Because the reallocation storage will not begin for at least three years after the project approval date, there is time for predictive modeling and associated mitigation to be developed. We recommend the AMP clarify the model's predictive use to initiate proactive mitigation along with associated action thresholds.

Additionally, although not specified in the Final FR/EIS, the dynamic model could also be useful to identify nutrient load control as a potential mitigation opportunity and it may support total maximum annual load (TMAL) refinement to assist in protecting against exceedances of standards. We recommend the AMP acknowledge the model's predictive use enabling a proactive identification of potential effects and TMAL refinement.

C. Aquatic Life and Fisheries

The AMP indicates that the Providers will work with CPW to ensure that neither the walleye brood stock program nor aquatic habitat downstream of Chatfield Reservoir will be negatively affected. We continue to recommend the addition of mitigation provisions presented in the *Draft Ecosystem Restoration Evaluation Report* (Great Western Institute et al., 2007; Appendix D) to address potential aquatic life impacts of flow and nutrient changes to the South Platte River downstream of Chatfield Reservoir. This report evaluated opportunities to protect and enhance fishery habitat through management of future water releases. The study found that alternative release patterns from the reallocated storage to address base flow conditions during the winter months (a critical aquatic stressor) can dramatically improve conditions.

D. Collective Operational Scenario

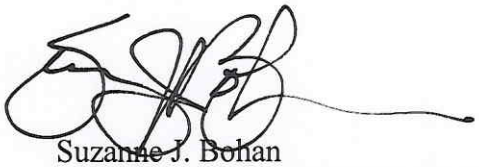
The revised detailed description of the Collective Operational Scenario and some of the preliminary discussions and interactions adds value to the AMP. Although much of discussion and cooperative effort has not yet occurred (and will by necessity include all Chatfield Reservoir stakeholders), the

Collective Operational Scenario concept offers a potentially powerful tool to help minimize the impact of the reallocation.

IV. Conclusion

We appreciate the opportunity to participate in the review of the Project. If we may provide further explanation of our comments during this stage of your planning process, please contact Phil Strobel, Deputy Director of our NEPA Compliance and Review Program at 303-312-6704, or your staff may contact Maggie Pierce, Lead NEPA Reviewer, at 303-312-6550.

Sincerely,



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